INSECTS OF MICRONESIA

Diptera: Empididae

By **LAURENCE W. QUATE**

Bernice P. Bishop Museum
Honolulu, Hawaii

INTRODUCTION

The United States Office of Naval Research, the Pacific Science Board (National Research Council), the National Science Foundation, and Bernice P. Bishop Museum have made this survey and publication of the results possible. Field research was aided by a contract between the Office of Naval Research, Department of Navy, and the National Academy of Sciences, NR 160-175.

This study is based on about 250 specimens collected by P. A. Adams, J. W. Beardsley, G. E. Bohart, J. F. G. Clarke, H. S. Dybas, R. J. Goss, J. L. Gressitt, N. L. H. Krauss, and C. W. Sabrosky. Specimens are deposited at the following institutions: Bernice P. Bishop Museum (BISHOP), United States National Museum (US), Chicago Natural History Museum (CM), and Museum of Comparative Zoölogy, Harvard University (MCZ).

Dr. A. L. Melander kindly identified *Drapetis brevicula* and *Elaphropeza formosae*. Mrs. Dorothy Rainwater made figure 6 and the drawings of the wings and antennae.

Prior to the inception of the Micronesian project, no empids had been reported from Micronesia, although a few species were known from Oceania. The following species were previously recorded: *Drapetis savaiiensis, Syneches alienus, S. devius,* and *S. brevispinus* [Collin, 1929, Insects of Samoa **6** (4): 177-184] from Samoa; *S. oedicnemus, S. spinidorsum,* and *S. pullus* (Bezzi, 1928, Dipt. Fiji, 51-55) from Fiji; *Chersodromia hawaiiensis* [Melander, 1938, Hawaiian Ent. Soc., Proc. **10** (1): 57] and *Drapetis insularis* [Melander, 1952, op. cit., **14** (3): 419] from the Hawaiian Islands; *Drapetis confusa* and *Syneches matema* (Curran, 1936, Calif. Acad. Sci., Proc., IV, **22**: 19, 20) from the Solomon Islands; *Drapetis crockeri* (Curran, loc. cit.) from the Cook Islands; and *Microphora angustifrons* [Krober, 1912, Ent. Mitt. **1** (8): 245] from New Britain.

the following institutions: Bernice P. Bishop Museum (BISHOP), United

This paper treats 13 additional species from Micronesia. At least six other species are represented in the Micronesian collections but are not described because of the unsatisfactory condition of the specimens.

ZOOGEOGRAPHY

The distribution of the Micronesian empids is summarized in the table. From this it is evident that most of the species are concentrated in the western Caroline Islands; more than one-half of the known species are found on Palau. The relative scarcity of species to the east of Yap must be partly artificial; if there are species on Ponape, Kusaie, and some of the atolls, it seems safe to assume that some also occur on Truk, but have not been collected there yet. However, the general picture of most species occurring in the western islands probably comes close to the true situation, since the larger number of species in the western Caroline Islands is out of proportion to the amount of collecting done there in relation to other parts of Micronesia.

Some endemism is indicated. The three species of *Drapetis* are closely related and conceivably could have come from a single ancestor. *Elaphropeza formosae, E. pollicata, E. adelphide,* and *E. semibadia,* as well as two species

Distribution of Micronesian Empididae

	Micronesian Island Groups										Other Localities
			Caroline								
	N. Mariana	S. Mariana	Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie	Marshall	Gilbert	
Tachydromiinae											
1. Chersodromia argentina*			×								
2. Drapetis brevicula		×	×	×	×						Formosa
3. D. simplex*				×							
4. D. kraussi*										×	
5. Elaphropeza formosae			×	×							Formosa
6. E. pollicata*								×			
7. E. adelphide*			×								
8. E. semibadia*		G†									
9. E. ponapensis*							×				
10. E. atrilinea*			×	×							
11. E. ekyphysis*								×			
Hybotinae											
12. Hybos dnopheros*							×				
13. Syneches platybregmus*			×								

* Described as new.
† G instead of × indicates Guam only.

not treated here, belong to a species group that also might have a common progenitor. On the other hand, the genera *Chersodromia, Hybos,* and *Syneches,* with only one species each in Micronesia, seem to be recent immigrants which have undergone little development within the islands.

The oceanic nature of the Micronesian empid fauna is shown by the spotty representation of the family. There are only 17 species in Micronesia of a family which has over 2,000 species in continental areas. Of the seven generally recognized subfamilies in the world, only two are in Micronesia. Melander (1927, Genera Insectorum, vol. 185) lists 97 genera of empids; only five of these are known to occur in Micronesia.

SYSTEMATICS

The Empididae are small to medium-sized flies belonging to the division Orthorrhapha of the suborder Brachycera. The head is usually spherical with an erect proboscis, the antenna is two- or three-segmented with an apical or subapical style or arista; the thorax is usually enlarged with a humpbacked scutum; the wing venation is simple with or without an anal cell and separated discal and second basal cells; and the male genitalia is not inflexed and is often large, conspicuous, and asymmetrical.

The male genitalia provide important taxonomic characters and are the most reliable means of separating closely related species. In the Tachydromiinae, the genitalia are asymmetrical and rotated to the left about 45 degrees. Tergite 9 is large and convex with an irregular apex. The lateral lamellae are adjacent to tergite 9 and quite dissimilar. The left is the largest and the most useful single taxonomic structure of the genitalia. The right lamella is much smaller, distinctly different in shape from the left, and closely associated with the aedeagus. The latter is complex, composed of a number of parts sclerotized to differing degrees. Sternite 9 is platelike and twisted to cover the ventral and right aspects of the genitalia. In the Micronesian Hybotinae, the genitalia may be similar to the above *(Hybos)* or symmetrical *(Syneches)* with a regular tergite 9 and similar lamellae.

KEY TO GENERA OF MICRONESIAN EMPIDIDAE

1. Anal cell absent, discal cell united with second basal cell.......... 2
   Anal and discal cells present.......... 4
2. First basal cell shorter than second.......... 3
   First and second basal cells subequal in length.......... **Chersodromia**
3. Antennal segment 3 oval or subrectangular; arista subapical, hairlike.......... **Drapetis**
   Antennal segment 3 conical; arista apical, tapering.......... **Elaphropeza**
4. Base of R_{2+3} arising before center of first basal cell; yellowish or brownish species.......... **Syneches**
   Base of R_{2+3} arising well beyond center of first basal cell; black species.......... **Hybos**

adjacent to tergite 9 and quite dissimilar. The left is the largest and the most

Small, black species, wing length about 1.5 mm. or less. Antenna three-segmented, segment 1 very short; segment 3 oval or subrectangular; arista subapical, hairlike, long, several times length of segment 3. First basal cell of wing definitely shorter than second; no anal cell. Middle abdominal tergites not conspicuously modified, 5 reduced and divided (evident only in cleared specimens), but not enlarged and without flattened hairs.

KEY TO MICRONESIAN SPECIES OF DRAPETIS

1. Hind femur same color as other femora.. 2
   Hind femur brown, other femora tawny..**4. kraussi**
2. Wing length 1.3-1.5 mm.; tibiae with several preapical bristles..................**2. brevicula**
   Smaller species, wing length 1.0 mm.; tibiae without preapical bristles......**3. simplex**

2. **Drapetis brevicula** Melander (fig. 1, *c-f*).

Drapetis brevis Bezzi, 1912, Mus. Nat. Hungarici, Ann. **10**: 483 (*nec* Meunier, 1908, Ann. Sci. Nat. Zool. **7**: 96).

Drapetis (Eudrapetis) brevicula Melander, 1927, Genera Insectorum **185**: 310.

Drapetis sp. (near *setigera*), Bohart and Gressitt, 1951, B. P. Bishop Mus., Bull. **204**: 42, 68.

Black species with tawny legs.

Male: Eyes nearly contiguous below antenna, separated and divergent above antenna, deep emargination laterad of antennal base; pair of large, divergent ocellar bristles, few other small hairs on vertical area; eye with slight sinuation above oral opening; head silvery pruinose below and behind eyes (Babelthuap specimen has protuberant silvery ridge between eyes below antennae). Mouthparts brown, palpus silvery, with several lateral and long apical bristles. Antenna brown; segment 2 with ventral bristles, longer than width of segment; segment 3 little longer than 1 and 2 combined, oval; arista subapical, long and slender, five times as long as segment 3.

Thorax entirely black, polished; scutum covered with fine, golden hair, with pair of dorsocentrals near apical margin of scutum, one pair of postalars, and two pairs of supra-alars; one pair of apical scutellars widely spaced, distances between bases equal to two-thirds length of bristle; pleuron bare; halter cream-colored. Legs tawny, last tarsal segments brown, femora with several subapical bristles, tibiae with two posteroventral bristles; fore coxa one-half length of fore femur. Wing as illustrated; ratio of sections of costa 20 : 7 : 12 : 4.

Abdomen black (sometimes segments 2 and 3 brown in color), very short in pinned specimens, very contracted, about one-half length of wing; tergite 1 reduced, very small; 2, 3, and 4 of normal size; internal, bilobed structure with opening between segments 4 and 5 (visible only in cleared specimens); 5 smaller than 4, reduced to thin sclerotized line near center; 6 and 7 about same size as 4; 8 a narrow ring, absent on dorsal part; sternites 3 and 4 with median, semicircular concavity on apical margin, concavity as deep as one-third length of sternite. Genitalia as illustrated, tergite 9 circular with apical lobe; left lamella globular with thumblike protrusion.

Female: Similar to male, without sexual dimorphism.

Wing length: 1.3-1.5 mm.

DISTRIBUTION: Formosa, Mariana Is., Caroline Is.

S. MARIANA IS. TINIAN: Male, Mt. Lasso, northwest slope, Apr. 1945, Dybas. GUAM: Male, Pt. Oca, June 1945, Dybas; two females, eight males, Pago, Oct. 1945, Bohart and Gressitt.

PALAU. NGAIANGL: Female, four males, at light, May 1957, Sabrosky. BABELTHUAP: Male, Ngiwal, at light, May 1957, Sabrosky. KOROR: Three females, Dec. 1952, Mar. 1953, Apr. 1957, Beardsley, Sabrosky.

YAP. YAP: Female, hill behind Yaptown, Dec. 1952, Gressitt; female, Ruul, near Yaptown, June 1957, Sabrosky. GAGIL-TOMIL: Two females, Gagil District, July-Aug. 1950, Goss.

CAROLINE ATOLLS. ULITHI: Male, Fassari I., Oct. 1952, Krauss; female, Falalop I., Sept. 1956, McDaniel.

This species (as *Drapetis* sp. near *setigera*) was reported by Bohart and Gressitt (1951) as commonly taken in bait traps and around garbage dumps. At the dump it was observed sucking blood from a newly emerged cypselid fly.

3. Drapetis simplex Quate, n. sp. (fig. 1, *g-j*).

Male: Eyes nearly contiguous below antenna, divergent above, deep emargination laterad of antennal base, angled posteriorly from base; two pairs of ocellar and one pair of widely separated vertical bristles, number of smaller hairs on ocellar triangle and vertex. Palpus short, ovate, with number of bristles; proboscis twice as long as palpus. Antenna with segment 1 very short; segment 2 twice as large as 1, with several bristles, ventral one largest; segment 3 twice as long as 2, subrectangular; arista dorsal, about four times length of 3.

Thorax brown. Scutum covered with fine hair, with pair of long dorsocentrals near scutellar suture, scutellum with pair of apical and lateral scutellars, lateral bristles about one-half size of apical; pleuron bare and shining. Femora with several preapical bristles; fore coxa one-half length of fore femur. Wing as illustrated; ratio of sections of costa 13:5:9.

Abdomen lighter brown than thorax; tergite 1 absent; 2 and 3 subequal in size; 4 about twice as long as 3, with patch of setae on lateral one-third; 5 divided, anterior part an elongate ovoid plate confined to center of segment, posterior narrow at center behind anterior, with patch of setae on lateral one-third; 6 consisting of two lateral plates, each with posterior row of setae; 7 longer than 6, with posterior row of setae; 8 reduced to thin, straplike sclerite, with row of setae; sternite 3 subrectangular, 4 and 5 represented by pair of small lateral sclerites widely separated. Genitalia as illustrated.

Wing length: Holotype 1.0 mm.

Female: Unknown.

Holotype, male (US 64594), S. Map I., Yap, July-Aug. 1950, Goss. Paratype, male, (BISHOP), Kanif, Yap I., July-Aug. 1950, Goss.

DISTRIBUTION: Western Caroline Is. (Yap).

4. Drapetis kraussi Quate, n. sp. (fig. 1, *k-m*).

Black species with tawny legs and brown hind femur.

Male: Eyes nearly contiguous below antenna, separated above, divergent from level of lower ocellus, deep emargination laterad of antennal base; pair of large, convergent vertical bristles and smaller, divergent ocellar bristles; eye with slight sinuation on posterior border. Mouthparts brown, palpus with gray reflection at certain angles. Antenna with segments 1 and 2 light brown, 3 and arista brown; 2 with short ventral bristles, about as long as width of segment; 3 little longer than 1 and 2 combined (6:5), oval; arista subapical, long and slender, three times as long as 3.

Thorax black, polished; scutum covered with fine, golden hair, with pair of dorsocentral bristles near apical margin of scutum, pair of large apical scutellars; pleuron bare; halter black or dark brown with cream-colored pedicel. Legs tawny, last tarsal segments light brown, hind femur brown, slightly swollen, hind tibia with small, ventral tubercle at apex; fore and mid-femur with several subapical bristles, hind femur with ventral, irregular row on apical half; fore coxa one-half length of fore femur. Wing as in *simplex;* ratio of sections of costa 20 : 6 : 13 : 7.

Abdomen black; tergite 1 much reduced, represented by very thin sclerite; 2, 3, 4 regular, each little larger than preceding; 5 about one-half as long as 4, divided by narrow, curved suture; 6 about as large as 5; 7 as large as 4; 8 reduced, absent in center, with row of bristles on posterior border; sternites as illustrated. Genitalia as illustrated.

Female: Similar to male except abdominal sclerites; tergite 5 smaller than 4, but not divided; sternites rectangular, not reduced as in male.

Wing length: Holotype 1.1 mm.; paratypes 1.1-1.2 mm.

Holotype, male (BISHOP 2905), Butaritari I., Butaritari Atoll, Gilbert Is., Dec. 1957, Krauss: allotype, female (BISHOP), same data. Paratypes, two males, female (BISHOP, US), same data as for holotype. Other paratypes, all Tarawa Atoll, Gilbert Is.: Female, Teaoraereke, Dec. 1957, Krauss; female, Bikenibeu, Nov. 1957, Krauss; female, Taborio, Nov. 1957, Krauss.

DISTRIBUTION: Gilbert Is.

This species is separable from other Micronesian *Drapetis* by the brown hind femur and structure of the male sternites, the latter being evident only in cleared specimens.

It is a pleasure to name this species after Mr. Noel L. H. Krauss, who has devoted much of his time to collecting specimens for the Micronesian studies.

Genus **Elaphropeza** Macquart

Elaphropeza Macquart, 1827, Ins. Dipt. N. France **3** : 86.—Coquillett, 1910, U. S. Nat. Mus., Proc. **37** : 537.—Melander, 1927, Genera Insectorum **185** : 305 (bibliog.).—Engel, 1939, IN Lindner, Flieg. Palaearkt. Reg., 28, Empididae, **4**(4) : 107.

Type species: *Tachydromia ephippiata* Fallén (monotypic).

Rather small, yellowish or dark-colored species, wing length about 1.5 to 2.0 mm. Antenna three-segmented, segment 3 elongate, conical or lanceolate, longer than segments 1 and 2 combined; arista apical, as wide at base as apex of segment 3, tapering, pubescent, as long as, or longer than, segment 3. Middle abdominal tergites enlarged, bearing some modified (enlarged or flattened) hairs and usually divided into two parts.

Key to Micronesian Species of Elaphropeza

1.	Scutum entirely or largely luteous or reddish brown, not entirely dark	2
	Scutum entirely black	**9. ponapensis**
2(1).	Scutum unicolored, without dark markings	3
	Scutum bicolored, luteous with definite dark markings	6
3(2).	Arista about twice as long as antennal segment 3	4
	Arista and segment 3 subequal in length	5

4(3). Thorax chiefly luteous; palpus pale yellow .... **5. formosae**
Thorax reddish brown; palpus brown .... **11. ekyphysis**

5(3). Palpus pale yellow, much lighter in color than thorax; male genitalia with left clasper not extending beyond apex of tergite 9 .... **6. pollicata**
Palpus brown, about same color as thorax; left clasper extending beyond apex of tergite 9 .... **7. adelphide**

6(2). Scutum yellow with posterior one-third dark reddish brown or black .... **8. semibadia**
Scutum with wide, dark stripe on midline .... **10. atrilinea**

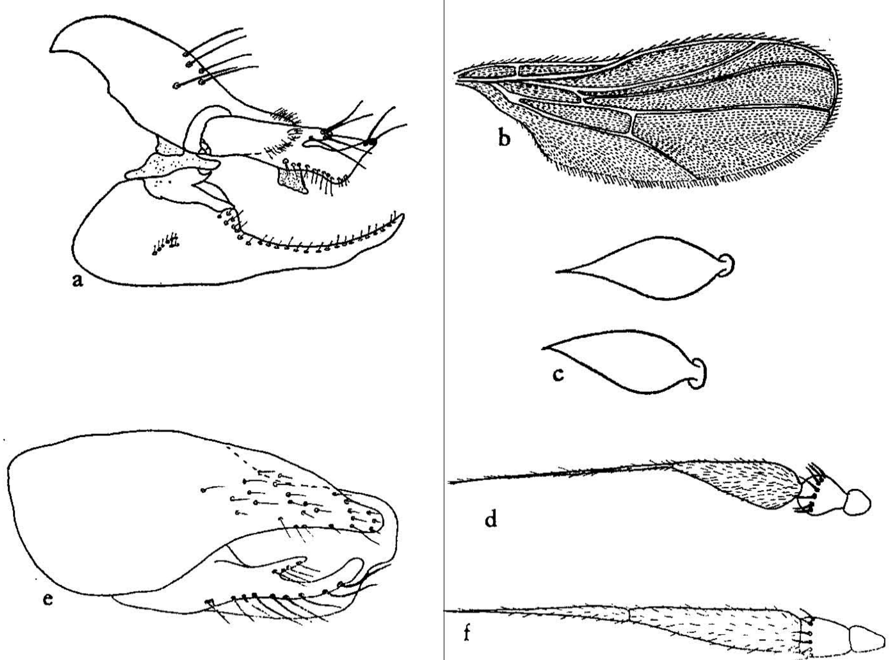


FIGURE 2.—**a-d**, *Elaphropeza formosae*: *a,* male genitalia, left side; *b,* wing; *c,* modified hairs on tergite 4; *d,* antenna. **e, f,** *E. pollicata: e,* male genitalia, dorsal view; *f,* antenna.

5. Elaphropeza formosae (Bezzi). (Figure 2, *a-d.*)

Drapetis formosae Bezzi, 1907, Mus. Nat. Hungarici, Ann. **5**: 566; 1912, op. cit., **10**: 480, 487 (Formosa).

Drapetis (Elaphropeza) formosae, Melander, 1927, Genera Insectorum **185**: 314.

Species with luteous thorax, pale-colored legs, and dark-brown, enlarged abdominal segment 4.

Male: Eyes contiguous below antenna, separated and divergent above, deep emargination laterad of antennal base; large pair of convergent ocellar and vertical bristles, number of smaller hairs on ocellar triangle and vertex. Mouthparts very pale yellow, proboscis

darkened at tip, palpus ovate. Antenna with segments 1 and 2 pale yellow, segment 3 and arista brown, segment 2 with circle of black bristles near apex; segment 3 pubescent, more than twice as long as 1 and 2 combined; arista nearly twice as long as segment 3, plumose.

Thorax luteous, metanotum, hypo- and metapleuron brown; legs white at base and progressively becoming yellowish toward apices; last tarsal segments brown; halter cream colored (sometimes gray). Scutum covered with fine hair, with pair of large dorsocentrals, three pairs of supraalars, and pair of postalar bristles, scutellum with pair of bristles near basal angles and pair of cruciate apical bristles, dorsocentral and post-scutellar bristles largest and most conspicuous; pleuron bare and shining. Legs moderately densely covered with fine hairs. Wing as illustrated; r-m and m crossveins and base of M_1 to apex of second basal cell much weaker than other veins; ratio of sections of costa 20 : 11 : 12 : 6.

Abdomen with sclerites mostly gray or brown, membranous areas white; tergite 1 absent; 2 and 3 consisting of pair of lateral triangular parts, divided in center on tergite 2 and straplike in center on 3; tergite 4 brown to dark brown, much enlarged, sparsely covered with flattened, leaflike hairs, microtrichia, and few unmodified hairs; 5 divided into two sclerites, anterior one about two-thirds as large as 4 and covered with hairs, posterior small, straplike with transverse row of hairs (anterior sclerite often telescoped into segment 4 and invisible in uncleared specimens); 6 and 7 about one-half as long as 4, bearing row of hairs on posterior margin; 8 much reduced, without vestiture. Genitalia as illustrated.

Female: Similar to male, without sexual dimorphism.

Wing length: 1.5-1.7 mm.

DISTRIBUTION: Formosa, western Caroline Is.

PALAU. ULEBSEHEL (Auluptagel): Two males, Sept. 1952, Krauss; two males, Ngarmalk (N. W. Auluptagel), 25 m., Dec. 1952, Gressitt.

YAP. RUMUNG: Female, June 1957, Sabrosky. YAP: Ten females, 11 males, July-Aug. 1950, Goss; three females, Weloy, June 1957, Sabrosky; two males, two females, Kolonia, June 1957, Sabrosky and July-Aug. 1950, Goss; female, Dugor, July-Aug. 1950, Goss; six females, six males, Kanif, July-Aug. 1950, Goss; six females, three males, N. Yap, July-Aug. 1950, Goss; five females, seven males, S. Yap, July-Aug. 1950, Goss. GAGIL-TOMIL: Three males, five females, Gagil District, Gachapar, at light, June 1957, Sabrosky; three males, Tomil District, July-Aug. 1950, Goss.

6. **Elaphropeza pollicata** Quate, n. sp. (fig. 2, *e,f*).

Species with reddish-brown thorax, yellowish-brown legs, and dark-colored abdomen.

Male: Eyes contiguous below antenna, narrowly separated and divergent above, deep emargination laterad of antennal base; large pair of ocellar and vertical bristles, number of smaller hairs on ocellar triangle and vertex. Mouthparts very pale yellow, palpus ovate. Antenna with segments 1 and 2 brownish yellow, segment 3 and arista brown, pubescent; segment 2 with circle of hairs near apex; segment 3 about twice as long as segments 1 and 2 combined; arista little longer than segment 3 (12 : 10).

Thorax reddish brown with white vestiture; legs yellowish brown with coxae and base of femora yellow, last tarsal segments brown; halter gray with yellowish pedicel. Scutum covered with fine hair, with pair of long dorsocentrals and pair of apical scutellars (specimens partly rubbed and other bristles indistinct); pleuron bare and shining. Legs covered with fine hairs; mid-femur and tibia with double row of short bristles, hind tibia with posterodorsal bristle near center. Wing as in *formosae;* ratio of sections of costa 20 : 14 : 14 : 5.

Abdomen chiefly brown; tergite 1 about one-half length of 2; 2 and 3 about one-half length of anterior part of 4; 4 divided into two sclerites, anterior sclerite with scattered setae, posterior sclerite about one-fourth length of anterior; 5 divided into two parts, anterior part about same size as anterior part of 4, covered with numerous short bristles, vestiture most conspicuous on abdomen, posterior very narrow, straplike; 6 and 7 little smaller than anterior part of 5. Genitalia as illustrated.

Wing length: Holotype 1.7 mm.; paratypes 2.0 mm.

Female: Unknown.

Holotype, male (US 64611), Hill 1010, 300 m., Kusaie, Apr. 13, 1953, Clarke. Paratype, male (BISHOP), Mt. Matante, south slope, 380 m., Kusaie, Mar. 4, 1953, Clarke.

DISTRIBUTION: Eastern Caroline Is. (Kusaie).

7. **Elaphropeza adelphide** Quate, n. sp. (fig. 3, *a-d*).

Species with reddish-brown thorax and brown abdomen.

Male: Eyes contiguous below antenna, narrowly separated and divergent above, emargination laterad of antennal base; pair of ocellar and vertical bristles, number of smaller hairs on ocellar triangle and vertex. Mouthparts brown, palpus ovate. Antenna with segments 1 and 2 brownish yellow; segment 3 and arista brown; segment 2 with circle of hairs near apex; segment 3 pubescent, about three times as long as segments 1 and 2 combined; arista pubescent, same length as segment 3.

Thorax reddish brown with yellow vestiture. Legs yellowish brown, lighter at base, last tarsal segments brown; halter gray with yellowish pedicel. Scutum covered with fine hair; pair of long dorsocentrals and pair of apical scutellars (specimen partly rubbed and other bristles indistinct); pleuron bare; legs covered with fine hairs. Wings as in *formosae;* ratio of sections of costa 20 : 11 : 12 : 5.

Abdomen with tergites 1, 2, 3 each about one-third length of 4; 4 largest abdominal tergite, bare; 5 divided into two parts, anterior part somewhat smaller than 4, covered with moderately dense bristles, posterior part reduced, narrow, straplike; 6 and 7 about one-half length of 4; 8 much reduced, straplike. Genitalia as illustrated.

Wing length: Holotype 1.7 mm.

Female: Unknown.

Holotype, male (US 64614), Ulebsehel (Auluptagel) I., Palau, Feb. 7, 1952, Beardsley. Paratype, male (BISHOP), Ngarmalk, Palau, Apr. 23, 1957, Sabrosky.

DISTRIBUTION: Western Caroline Is. (Palau).

8. **Elaphropeza semibadia** Quate, n. sp. (fig. 3, *e,f*).

Drapetis sp., Bohart and Gressitt, 1951, B.P. Bishop Mus., Bull. **204**: 68.

Species with thorax half yellow and half dark reddish brown or black, antenna with arista very much longer than segment 3.

Male: Eyes contiguous below antennae, narrowly separated and weakly divergent above, deep emargination laterad of antennal base; pair of recumbent ocellar bristles, two pairs of vertical bristles, one large pair widely separated and convergent, smaller pair between larger ones, divergent. Palpus white, ovate; proboscis brownish yellow. Antenna pale yellow, arista brown; segment 1 very short and inconspicuous; segment 3 short, conical, subequal to segments 1 and 2 combined; arista five times as long as segment 3, pubescent.

Thorax yellow, posterior one-third (sometimes one-half) of scutum and scutellum brown, anterior margin of brown marking concave (sometimes straight); halter straw

above, deep emargination laterad of antennal base; pair of recumbent ocellar and erect vertical bristles, number of smaller hairs on ocellar triangle and vertex. Palpus white, ovate; proboscis brown. Antenna with segments 1 and 2 pale yellow, segment 3 and arista brown and pubescent; segment 2 with circle of hairs near apex; segment 3 about twice as long as segments 1 and 2 combined; arista subequal to length of segment 3.

Thorax reddish brown (sometimes yellowish brown) with wide black stripe on midline of scutum; last tarsal segments brown; halter straw colored. Scutum covered with fine hair, with pair of long dorsocentrals and pair of apical scutellars, smaller pair of supra-alars and postalars; pleuron bare and shining. Legs covered with fine hairs. Wing as in *formosae;* ratio of sections of costa 20 : 11 : 13 : 5 (variable).

Abdomen chiefly brown; tergite 1 very small, absent in center; 2 and 3 consisting of pair of triangular parts; 4 very broad, with scattered setae; 5 divided into two parts,

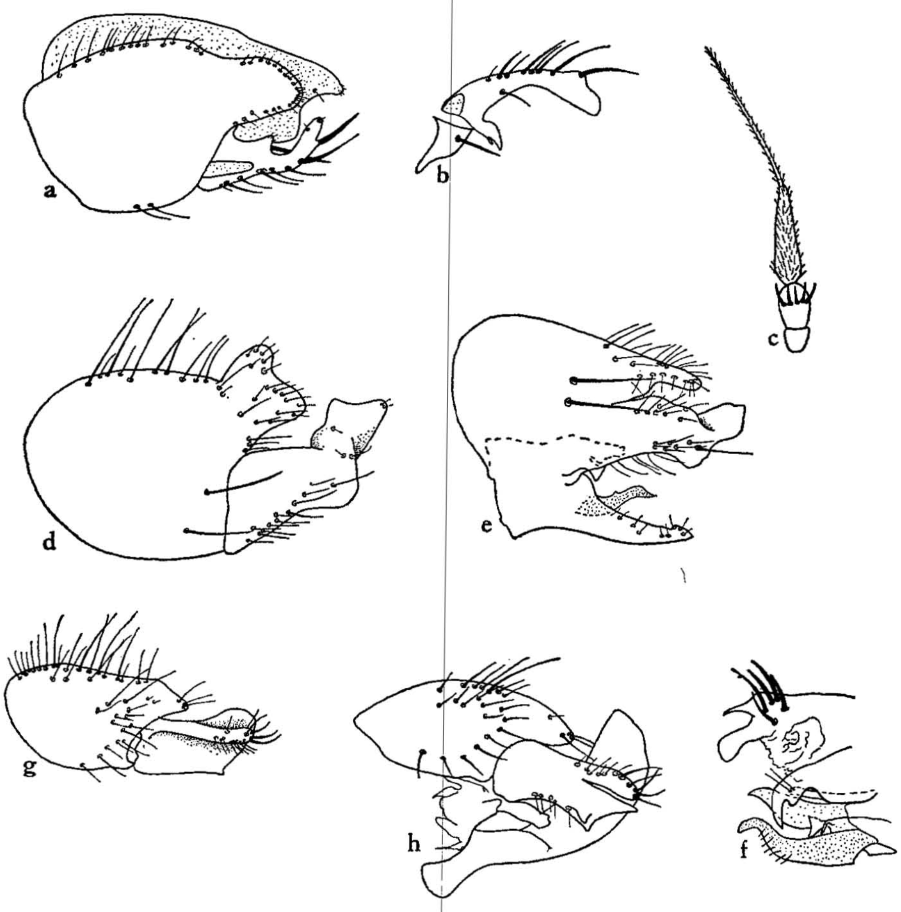


FIGURE 4.—**a-c,** *Elaphropeza ponapensis: a,* male genitalia, dorsal view; *b,* male genitalia, left lamella; *c,* antenna. **d-f,** *E. atrilinea: d,* male genitalia, dorsal view; *e,* male genitalia, left side; *f,* male genitalia, aedeagus and right lamella. **g, h,** *E. ekyphysis: g,* male genitalia, dorsal view; *h,* male genitalia, left side.

anterior part about one-half size of 4, covered with numerous short bristles, this vestiture most conspicuous of abdomen; 6 and 7 little smaller than anterior part of 5, with posterior row of hairs. Genitalia as illustrated.

Female: Similar to male, but thorax darker and black stripe less distinct.

Wing length: Holotype 1.7 mm.; allotype 1.8 mm.; paratypes 1.7 mm.

Holotype, male (US 64731), Yap I., Aug. 1952, Krauss; allotype, female (US), same data. Paratypes, five males, female (BISHOP), same data as for holotype.

Other specimens: Kolonia, Yap, July-Aug. 1950, Goss; Kolonia, Yap, June 12, 1957, Sabrosky; Koror, Palau, Mar. 10, 1954, Beardsley; Ulebsehel (Auluptagel), Palau, Jan. 10, 1953, Beardsley.

DISTRIBUTION: Western Caroline Is. (Palau, Yap).

11. **Elaphropeza ekyphysis** Quate, n. sp. (fig. 4, *g, h*).

Reddish-brown species with yellowish-brown legs and brown abdomen.

Male: Eyes contiguous below antenna, moderately divergent above antenna to ocelli and then strongly divergent beyond ocelli, emargination laterad of antennal base; pair of ocellar bristles and two pairs of vertical bristles in addition to number of smaller hairs on head. Mouthparts light brown, palpus ovate. Antenna brown, antennal segment 2 with circle of small black bristles near apex; segment 3 and arista pubescent, segment 3 about twice as long as 1 and 2 combined; arista twice as long as segment 3.

Thorax reddish brown; legs yellowish brown, little lighter at apex, last tarsal segments brown; halter reddish brown. Scutum covered with fine hair; two pairs of dorsocentrals, three pairs of supraalars, and pair of apical scutellars; pleuron bare and shiny. Legs covered with fine hairs; hind tibia with long, posterior bristle near center. Wing as in *formosae;* ratio of sections of costa 20 : 11 : 13 : 16.

Abdomen brown; tergite 1 very narrow, interrupted on midline with single row of hairs; 2 and 3 with scattered setae, reduced on midline; 4 long, about three times maximum length of 3, with sparse setae; 5 divided, anterior part densely covered with short setae, about one-half length of 4, consisting of two lateral plates disconnected at center, posterior part very narrow, straplike; 6 and 7 subequal in size, about equal to anterior part of 6, with posterior row of setae; 8 much reduced, about one-third length of 7, without conspicuous vestiture. Genitalia as illustrated.

Wing length: Holotype 1.65 mm.; paratypes 1.5-1.7 mm.

Female: Unknown.

Holotype, male (US 64732), Pukusrik, 1 m., Kusaie, Apr. 2, 1953, Clarke. Paratypes, four males (BISHOP), same data as for holotype.

DISTRIBUTION: Eastern Caroline Is. (Kusaie).

SUBFAMILY HYBOTINAE

Genus **Hybos** Meigen

Hybos Meigen, 1803, IN Illiger, Mag. Insekt. **2**: 269.—Coquillett, 1910, U.S. Nat. Mus., Proc. **37**: 553.—Melander, 1927, Genera Insectorum **185**: 18 (syn., bibliog.).—Frey, 1956, IN Lindner, Flieg. Palaearkt. Reg., 28, Empididae, **4**(4) : 608 (syn., bibliog.).

Type species: *Musca grossipes* Linnaeus (=*Hybos funebris* Meigen).

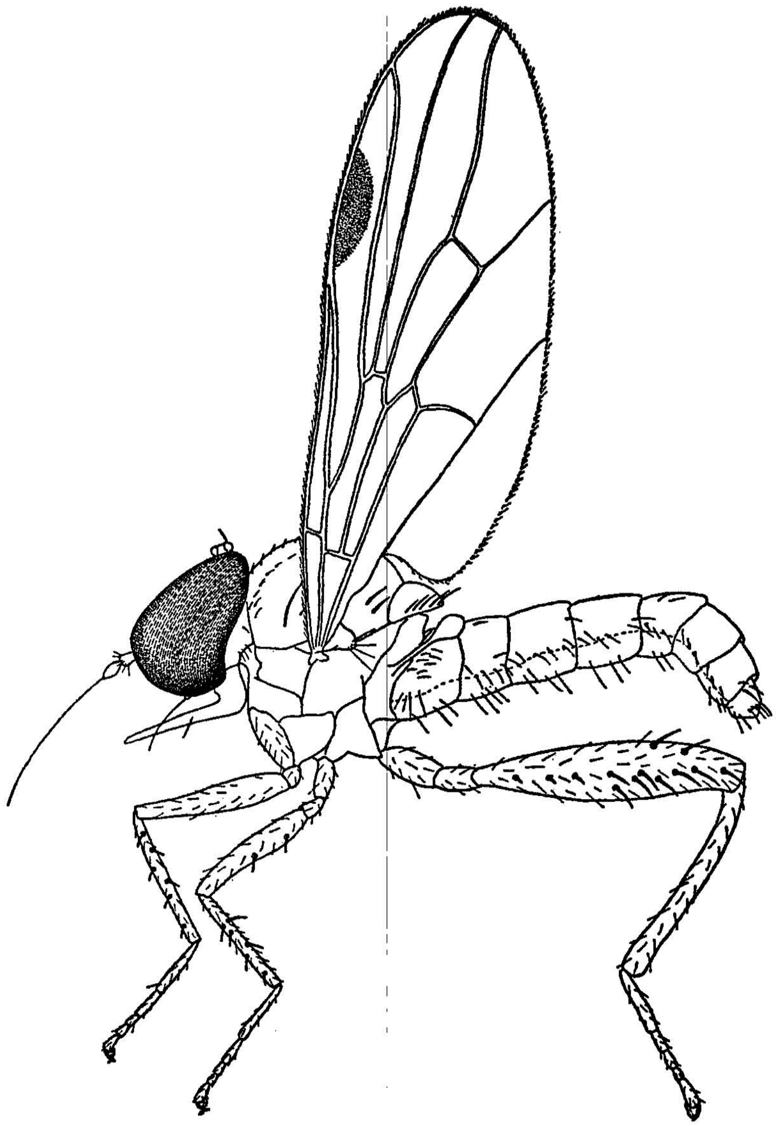


FIGURE 6.—*Syneches platybregmus*, female.

and longer than hind tibia, hind tibia with curvature at base. Wing as illustrated; stigma faint, well separated from R_2. Halter luteous with spot of brown at base of knob.

Abdomen: Tergite 1 luteous, 2 luteous with small, posteromedian area brown; 3 brown with sides and anterior margin luteous; 4 and 5 brown with anterior margin luteous; remaining tergites and genitalia brown; venter yellowish, posterior two sternites brown. Genitalia as illustrated.

Wing length: Holotype 5.0 mm.; paratypes 5.0 mm.

Female: Unknown.

Holotype, male (US 64734), Koror I., Palau, May 27, 1957, Sabrosky. Paratypes, two males (BISHOP), same data as for holotype.

DISTRIBUTION: Western Caroline Is. (Palau).